DATONG
ELECTRONICS LIMITED

MORSE TUTOR

An instantly available source of precision Morse for training purposes at all levels of skill.

THE REVOLUTIONARY NEW WAY TO PRACTICE MORSE CODE RECEPTION. AN UNLIMITED SUPPLY OF PRECISION MORSE AT THE TURN OF A SWITCH, PLUS BUILT-IN OSCILLATOR FOR SENDING PRACTICE.

- Sends a continuous stream of precision Morse in five character groups which never repeat.
- Variable speed and variable delay between characters for optimum learning efficiency.
- Letters only, numbers only, or mixed.
- Built-in tone oscillator for sending practice (key required).
- Earphone socket for private listening.
- Eleven IC, CMOS circuit for long internal battery life.

PRECISION MORSE

The Dantong Morse Tutor sends a continuous stream of precision Morse Code in random five letter groups. Its sending is impeccable; it never repeats and it never tires.
You can select letters only, numbers only, or letter and numbers mixed, at the flick of a switch.

OPTIMUM LEARNING TECHNIQUE

Best of all not only can you vary the basic sending speed from 6.5 to 37 words per minute, you can also increase the delay between letters from the "correct" value (3 dot periods) to a maximum of over 3 seconds.
This delay facility means that right from the start you can learn each letter and number as it ought to be learnt, that is with the dots and dashes within a letter fast enough to form a complete sound pattern, but with a long delay between each letter. As you improve you simply reduce the delay between letters.

USES YOUR TIME TO BEST ADVANTAGE

Skill at Morse reception only comes with practice and this uses up valuable leisure time. With Model D70 you can make every minute count because you can tailor the level of difficulty exactly to your own ability.
Moreover you are no longer tied to someone else's timetable. Morse Tutor is available at any time day or night so you can snatch a few minutes practice whenever it suits you. This way your practice sessions can make use of time which would otherwise be wasted, while travelling for example.

ALWAYS FRESH

Unlike tapes and records whose sequence becomes familiar surprisingly quickly, the Morse Tutor never repeats the same sequence twice. This means you don't have to ration the supply to avoid wasting it.

LEARN WITH CONFIDENCE

Morse Tutors' calibrated controls mean there will be no doubt about when you are up to examination speed. With today's examination fees it pays to pass first time.

AFTER THE MORSE EXAM

After Morse Tutor has helped you to pass the Morse Exam it will painlessly help you to the still higher speeds which are needed to get the full enjoyment from real-life operating. Its wide speed range means that even experts can use Morse Tutor to keep in trim or as a refresher course.

HOW TO LEARN MORSE WITH THE DATONG TUTOR

The key to learning Morse is to learn each character as a complete sound pattern not as a set of individual dots and dashes. It is important also to be able to receive Morse reasonably well before you begin to practice sending.
Start with Morse Tutor set to between 8 and 12 words per minute but with maximum delay between characters. This way you learn the correct rhythmic sound of each character in the code list. As you become familiar with the code, gradually reduce the delay between letters. Ideally the speed should always be slightly faster than you are able to read comfortably.
Many short practice sessions are much better than few long ones. Take advantage of Morse Tutor's portability and personal earpiece to snatch as many practice sessions as possible. You can learn Morse with minimum disruption to your normal activities by using time which would otherwise be wasted for example while travelling to and from work.

Once you have learnt the basic code and can recognise the characters from memory, your main practice should consist of writing down the output from Morse Tutor. Use longhand right from the start rather than printing, otherwise as you progress your ability to copy Morse will outstrip your speed of writing. It is also beneficial to listen to Morse Tutor's output even at times when you are unable to write it down. This helps you to recognise the "tune" of each character and to split up the continuous stream into separate characters.
Do not be discouraged if your progress appears to come to a halt at various stages. This is quite normal and in fact is normally a prelude to a significant jump in receiving speed.
When you have reached a speed of about six words per minute you are ready to begin sending practice. Simply plug a conventional Morse Key into the *KEY' jack on the rear panel of Morse Tutor. This disables the automatic sending circuitry and the unit will produce a tone whenever the key is pressed /(the key should close a contact when pressed).

INTERNATIONAL MORSE CODE

Morse code comprises a stream of dots and dashes. If the duration of a dot represents one time unit, a dash is three units, the space between dots and dashes within a character is one unit, the space between letters in a word is three units, and the space between words is seven units.
When the 'DELAY' control is set to the 'CALIBRATE' position (fully clockwise) Morse Tutor produces Morse with the above timing and in five character groups. As extra delay is introduced between letters the delay between words becomes just twice the delay between letters. Timings within each letter are determined only by the 'SPEED' control.
The basic Morse characters are given below in the form of dots and dashes. When saying them either aloud are mentally use "dit" to represent a dot and "dah" for a dash. Letter C for example is pronounced dahdidadit. It is important to learn the code as sounds not as visual patterns.

A ·-	N -·	1 ·----
B -···	O ---	2 ··---
C -·-·	P ·--·	3 ···--
D –..	Q --·-	4 ····-
E ·	R ·-·	5 ·····
F ··-·	S ···	6 -····
G --·	T -	7 --···
H ····	U ··-	8 ---··
I ··	V ···-	9 ----·
J ·---	W ·--	0 -----
K -·-	X -··-	
L ·-··	Y -·--	
M --	Z --··	

AUDIO NOTE

The frequency of the audio tone can be altered if desired by adjusting the preset potentiometer labelled 'NOTE' on the printed circuit board. To open proceed as described under "battery replacement".

BATTERY REPLACEMENT

When Morse Tutor produces all dots or all dashes the battery should be replaced.

First switch off the unit. Then remove the top two screws on both front and rear panel and lift off the upper half of the case. The battery can then be replaced. Take care to observe the correct polarity. **WARNING:** When replacing the panel screws take care not to strip the threads by overtightening.

DATONG ELECTRONICS LIMITED

Spence Mills, Mill Lane, Bramley. Leeds LS13 3HE. England
Telephone: 0532 552461

SERVICE INFORMATION - MODEL D70

THE CIRCUIT AND SERVICE INFORMATION SUPPLIED IS CONFIDENTAL AND FOR USE BY DATONG AGENS ONLY.

1. Refer also to circuit diagram, data sheet, PCB layout.

2. Dismantling

Remove the eight screws holding both front and rear panels. This allows the top half of the case to be removed. To remove the PCB remove the four screws through the PCB. Leave the panels and controls soldered to the PCB leads.

3. Circuit description

A 'noisy' clock oscillator (IC10a, b) clocks the adress counter (IC8, IC9) for the PROM (IC7) at a random rate. When informaton for the next character is required a brief positive pulse is generated by Q4 which powers up the PROM. Information at the PROM's outputs (pins 1, 2, 3, 4, 5, 6, 7, 9) is then latched into IC5 and IC6 by a strobe pulse from pin 10 of IC3a. The strobe pulse is slightly delayed from the power-up pulse by R8 and C5. The strobe pulse is very short (mainly determined by R9 and input capacitance of pin 10 of IC2b).

Information captured by IC5 determines the length of the next character. Information stored in IC6 (shift register) determines the dot-dash sequence. A 'low' into the preset inputs of IC6 signifies a dash and a 'high' dot.

Characters are read out at a rate determined by the main timing oscillator (IC1a and b) under the control of the "SPEED" control. The square wave from IC1b is converted into a single dot-plus-space (one cycle of the clock) or a dash-plus-space (two cycles of the clock by IC2a and IC3b). When pin 4 of IC2a is low dashes are produced and dot when pin 4 is high.

During the read out of a character IC5 counts up by one for every dot or dash from the number originally loaded into it by the strobe pulse. When the number reaches binary eight pin 2 goes high. This turns off the audio output via R3 and after a delay determined by VR2 and causes D on IC2b to go high. Furthermore pin 4 of IC2a is forced high via IC3c so that a "silent dot" is produced. At the end of this "silent dot" Q of IC2b goes high and data for the next character is called up from the PROM. The "silent dot" in effect constitutes the inter letter space (3 time units) while the extra delay (if any) selected by VR2 and C6 adds to the inter letter space.

After five interword spaces have been counted by IC4 its pin 2 goes high and forces the production of a "silent dash" (via IC3d). It also presents a high at pin 3 of IC5 during the load pulse and this transfers immediately to pin 2 after the "silent dash" thereby causing the letter to be followed immediately by a "silent dot". The two together constitute the seven time unit interword space.

When letters are being produced the combination IC8/IC9(a) counts cyclically down in binary from 26 to 1. The state zero exists only for the time

required for IC8 and IC9(a) to self reload to 26. Any fault in this resetting will cause adress zero to be accessed and this will produce the illegal character da-dah-dah-dah.

With number generation IC9(a) remains held with pin 1 high and IC8 counts down from 26 to 17. Here the never-normally-accessed address is 16. If, due to a fault, it is accessed the illegal charcter produced is dah-dah-dit-dit-dah.

In the "numbers" mode D7, D6 and D5/R12 ensure that IC5 is allways loaded with binary "3". The character lenght then being 8-3 = 5.

In the "mixed" mode IC9(b) extends the adress counter by an extra bit and its output determines whether the next character is to be a number or a letter.

4. Typical faults

The following faults have occurred at various times in the past.

(a) Accidental unsoldered feed through pins or IC top pins can cause illegal letters to be produced.

(b) Some specimens of IC10 have resulted in random clock pulses which are too narrow to clock IC8 correctly. This results in the illegal addresses 0 and 16 being accessed. The pulse train at pin 11 of IC10(b) should look symmetrical about 2.5 volts.

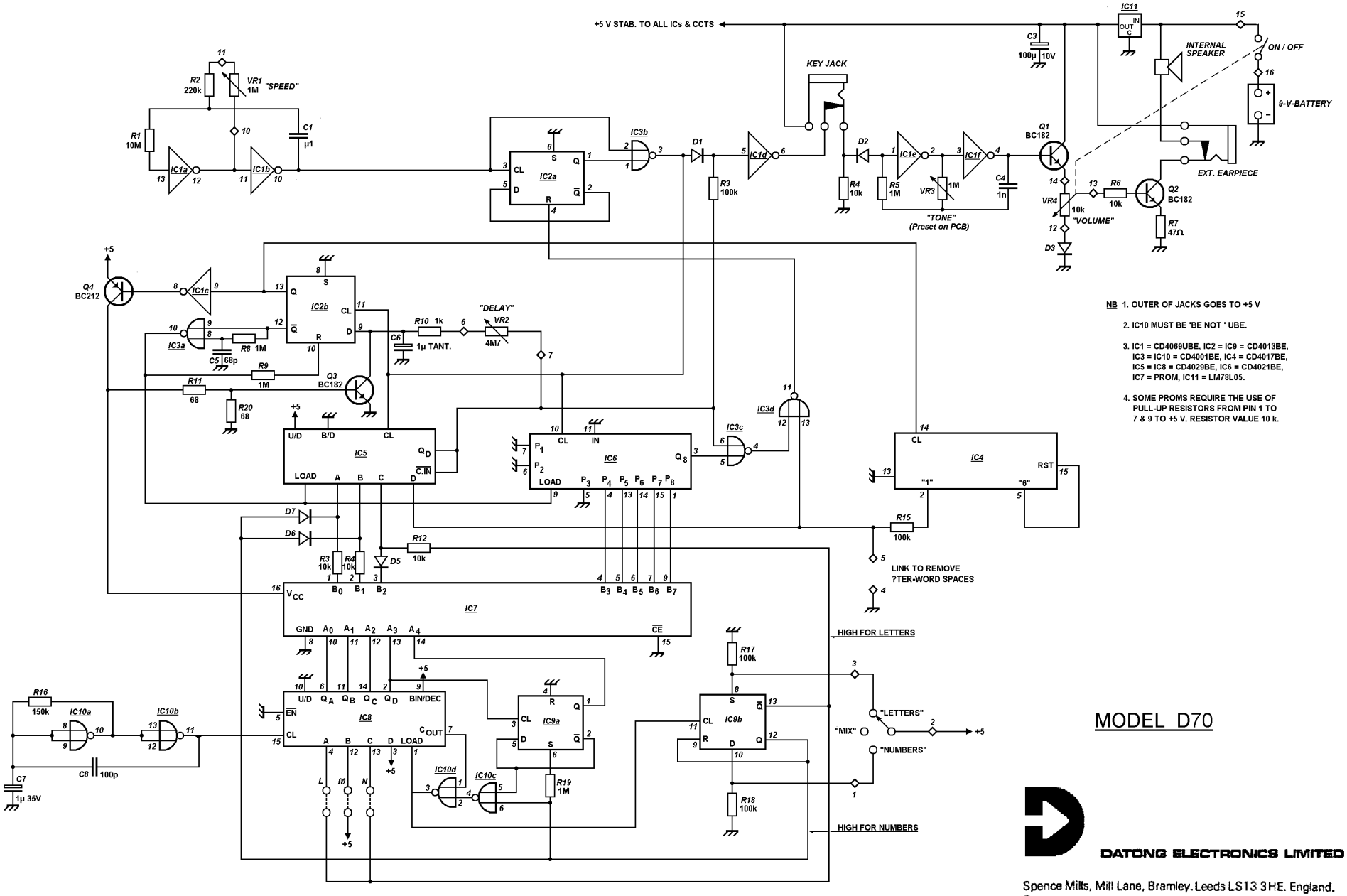
(c) If Q4 does not turn fully "off" Q3 can remain slightly "on". When VR2 is set to a high value this can cause a very long, even an infinite delay to occur as charge leaks through Q3 faster than VR2 can supply it. R20 was added later to avoid this.

5. Other points

(a) Reducing C1 allows faster sending speeds to be achieved.

(b) Adding a jack to the rear panel to allow an external supply to be used can short out the regulator if an uninsulated jack is used. This is because the back panel is at +5 volts. If this happens the TTL PROM will probably be damaged.

(c) If an output for a tape recorder is required from the earphone jack a resistor (say 100R) is required to maintain a DC path for collector current in Q2.


+5 V STAB. TO ALL ICs & CCTS
KEY JACK
INTERNAL SPEAKER
ON / OFF
9-V-BATTERY
EXT. EARPIECE
"SPEED"
"TONE" (Preset on PCB)
"VOLUME"
"DELAY"
LINK TO REMOVE ?TER-WORD SPACES
HIGH FOR LETTERS
HIGH FOR NUMBERS
"LETTERS"
"MIX"
"NUMBERS"
L
M
N
NB 1. OUTER OF JACKS GOES TO +5 V
2. IC10 MUST BE 'BE NOT ' UBE.
3. IC1 = CD4069UBE, IC2 = IC9 = CD4013BE, IC3 = IC10 = CD4001BE, IC4 = CD4017BE, IC5 = IC8 = CD4029BE, IC6 = CD4021BE, IC7 = PROM, IC11 = LM78L05.
4. SOME PROMS REQUIRE THE USE OF PULL-UP RESISTORS FROM PIN 1 TO 7 & 9 TO +5 V. RESISTOR VALUE 10 k.

MODEL D70

DATONG ELECTRONICS LIMITED

Spence Mills, Mill Lane, Bramley. Leeds LS13 3HE. England.
Telephone: 0532 552461

18-3-80